The Village at Springbrook Farms

Editor's Note: While we do not necessarily advocate the conversion of farmland for residential, commercial or industrial purposes, we have chosen to highlight this project because it incorporates low impact development (LID) principles and green stormwater management methods to minimize the impact to the larger environment. While building on brownfields or reusing existing housing stock may be more sustainable, this is a dense, walkable development and the best management practices (BMPs) used in this project serve as a model.

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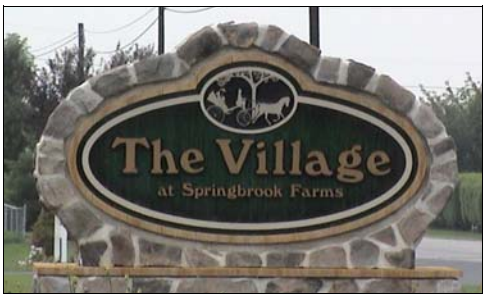
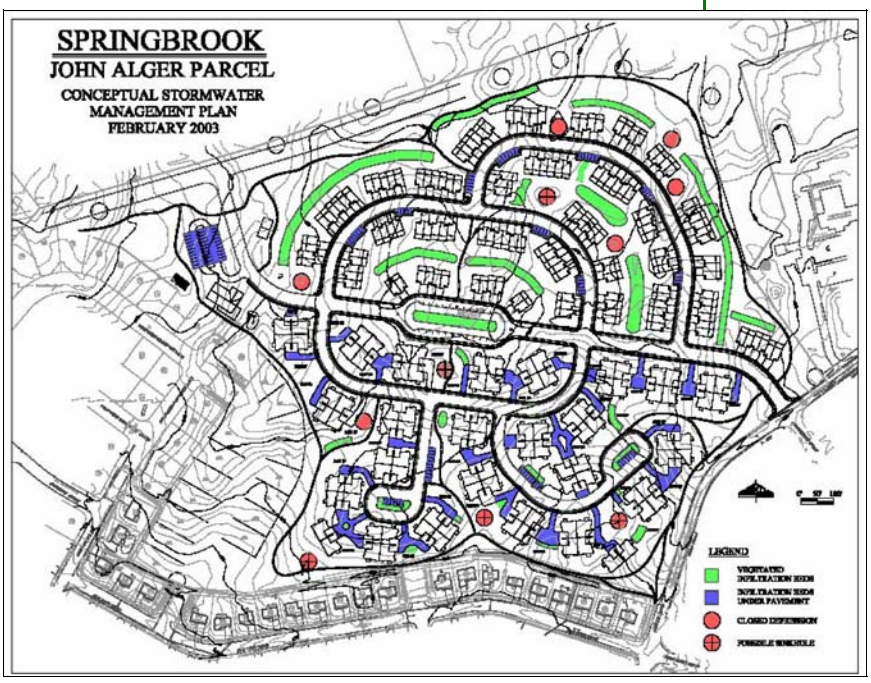


Many traditional neighborhood developments increase the amount of stormwater runoff in an area, due to large amounts of non-porous pavement and turfgrass. This runoff can cause ecological and economic devastation through flooding, erosion and water pollution. The Village at Springbrook Farm is a 259-unit (149 townhomes, 96 quads, 17 single-family homes) low-impact development (LID) residential neighborhood in Campbelltown, Lebanon County.

The way the 59-acre site was designed aims to avoid such negative consequences by incorporating sustainable stormwater management practices. According to Wes Horner, former associate at CH2M HILL (the engineering firm responsible for the LID design), "Our approach at Springbrook was to keep the stormwater as close to the source as possible, cleansing and recycling it with many different 'best practices'." All in all there will be 124 storage/ infiltration elements on the site.



The site's stormwater management plan map

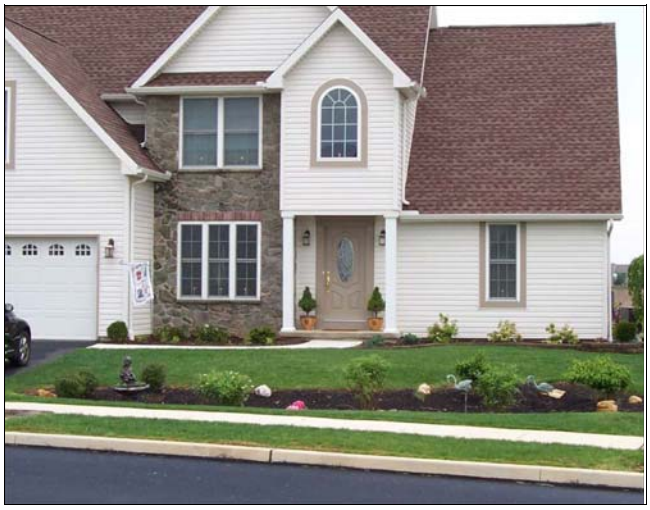
The development project began in 2002. One of the first steps in the process was to do extensive geological and hydrological studies of the site to ensure that the chosen BMPs did not cause structural damage to the under-lying geology and groundwater. Much of Lebanon County is home to karst topography and limestone, a combination that makes the area prone to sinkholes. Before any homes could be built on such a site, the sink hole problem had to be dealt with. Nearly half of the site's stormwater drained into closed depressions like the one shown on the next page.

If standing water like that remained, sinkholes could potentially open up. On a farm field those issues are a nuisance, but in a residential neighborhood they can be dangerous. Therefore, any stormwater management method used on the site needed to have water infiltrate at a controlled rate and infiltration beds needed to be as close to the surface as possible, and spread out through the site. This allows the system to effectively remove pollutants from the runoff, while reducing the risk of sinkhole formation. Because of the site's topography, traditional stormwater management methods would have required excessive grading and excavation, which is costly and not recommended over limestone.

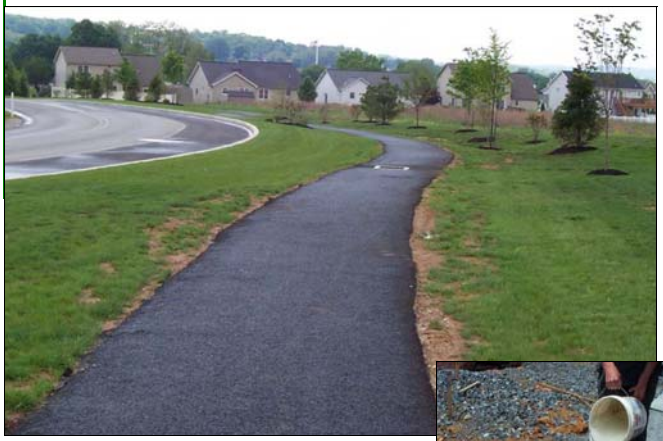
Evidence of karst topography on site, pre-development

Instead of using several large, unsightly detention basins, as is typically used in residential neighborhoods of this size, CH2M HILL chose several sustainable methods of mitigating stormwater runoff. Porous asphalt paving was used for the sidewalks, parking areas and paths (*see photos on right*). The porous paving is installed on top of a stone-filled recharge bed that purifies stormwater as it infiltrates into the ground. On-site rain gardens and vegetated swales also help to cleanse stormwater, while providing aesthetically pleasing landscape views for the residents.

Homeowners are pleased with the stormwater elements and the realty company uses them for marketing purposes: "The Village is a low impact development offering some of the newest and most unique storm water management systems in the area. Our environmentally friendly system uses aesthetically pleasing rain gardens and infiltration beds which are incorporated into the landscape providing plenty of green space while recharging the ground water source."

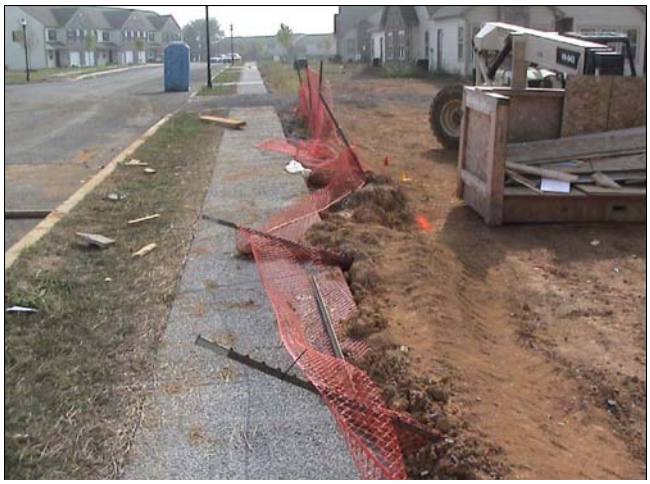


Individual home rain garden



Porous asphalt bike path (above) and sidewalk (on right)

As with most, if not all large construction projects, some small glitches had to be taken into consideration, such as the need to continuously maintain rigorous erosion and sediment control measures, ensuring that infiltration areas were not placed too close to limestone pinnacles, and the coordination of overall site construction with storm-water BMP construction, in terms of phasing, site protection, and materials (*see photo below*). These issues become all the more important on multi-phased residential projects, like this one, that can go on for years.



Coordinating construction presented challenges

For the most part, maintenance has been straightforward and handled in the same manner as any residential common area would be handled. One minor difficulty that was encountered was that the mulch originally used in the rain gardens tended to float when the gardens took on water. This led to the need for filter baskets in the rain garden overflow structure to catch mud, debris, leaves and other detritus.

Mulch in the rain garden caused some minor difficulties

You may ask yourself why an engineering firm would choose to implement these sustainable practices, especially considering that many green technologies like porous pavement can have a greater upfront cost. For one thing, with all of these technologies in place the site is able to have no net increase in runoff volume during a 2-year frequency, 24-hour duration storm event and no increase in peak flow rates for 1-year through 100-year storms. This helps the project meet government regulations and protect property from flooding. Long-term maintenance costs on systems like rain gardens can be much lower than in traditional gray infrastructure, as well.

But it's also deeper than that. For CH2M's Andrew Potts, P.E., "Sustainability is critical to me. My goal is to instill sustainability as much as possible in every project. To me it's so ingrained that I have to ask, "why not?" Why wouldn't we protect and sustain our drinking water supply? Why wouldn't we improve water quality in our stream systems and the Chesapeake Bay? Why wouldn't we want to create beautiful, walkable, bikeable residential communities with native vegetation instead of nothing but turf grass?"

CREDITS

LID/Stormwater design — CH2M HILL (formerly Cahill Associates)

Owner/Developer — Brownstone Real Estate Company

Landscape Architect — RGS Associates

Site Contractor — Abel Construction